

2008 Annual Drinking Water Quality Report

Public Water System Name: USAF-Luke
Public Water System Number: AZ04 -07-305

This is an annual report on the quality of drinking water delivered by Luke Air Force Base. Under the "Consumer Confidence Reporting Rule" of the Federal Safe Drinking Water Act (SDWA), community water systems are required to report this water quality information to the consuming public. This report presents information on the source of our water, its constituents and the health risks associated with any contaminants. It also contains extensive technical language required by the Environmental Protection Agency (EPA), which is designed to further public understanding about public water systems and potential hazards across the country.

General Information About Drinking Water

All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV-AIDS or other immune system disorders, some elderly, and infants can be particularly at risk of infections. These people should seek advice about drinking water from their healthcare providers. For more information about contaminants and potential health effects, or to receive a copy of the U.S. Environmental Protection Agency (EPA) and the U.S. Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and microbiological contaminants call the EPA Safe Drinking Water Hotline at 1-800-426-4791.

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- **Microbial contaminants**, such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants**, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides** that may come from a variety

of sources, such as agriculture, urban stormwater runoff, and residential uses.

- **Organic chemical contaminants**, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and also may come from gas stations, urban stormwater runoff, and septic systems.
- **Radioactive contaminants**, that can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the Arizona Department of Environmental Quality prescribes regulations limiting the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration regulations establish limits for contaminants in bottled water.

Our Water Source(s)

Luke Air Force Base's drinking water is groundwater supplied through various wells that pump from the West Salt River Valley sub-basin within the Phoenix Active Management Area defined by the Arizona Department of Water Resources. The water from these on-base wells is treated with chlorine as a disinfectant at the well head, mixed within the distribution system, stored in three above ground tanks on base, and distributed throughout the base and base housing. In addition, Luke AFB has one location that provides purified water that has been through an extra filtration process called reverse osmosis. This filtration removes contaminants that may affect taste and other aesthetics. Taps that supply this water are located at the building beneath the water tower near the intersection of Bong Lane and Mitchell Street.

Source Water Assessments on file with the Arizona Department of Environmental Quality are available for public review. If a Source Water Assessment is available, you may obtain a copy of it by contacting the Arizona Source Water Coordinator at (602) 771-4641.

The Source Water Assessment Report provides a screening-level evaluation of potential contamination that could occur. It does not mean that the contamination has or will occur. We can use this information to evaluate the need to improve our current water treatment capabilities and prepare for future contamination threats. This can help us ensure that quality finished water is delivered to your homes. In addition, the source water assessment results provide a starting point for developing a source water protection plan.

Luke AFB's drinking water is managed by two base agencies. Civil Engineering (56 CES/CEOI) manages the maintenance and operations of the drinking water supply and distribution system. Bioenvironmental Engineering (BE) (56 AMDS/SGPB) monitors the quality of the drinking water provided to consumers and addresses any related health concerns.

Terms and Abbreviations

To help you understand the terms and abbreviations used in this report, we have provided the following definitions:

- **Parts per million (ppm) or Milligrams per liter (mg/L)** - one part per million corresponds to one minute in two years or a single penny in \$10,000.
- **Parts per billion (ppb) or Micrograms per liter (µg/L)** - one part per billion corresponds to one minute in 2,000 years, or a single penny in \$10,000,000.
- **Parts per trillion (ppt) or Nanograms per liter (nanograms/L)** - one part per trillion corresponds to one minute in 2,000,000 years, or a single penny in \$10,000,000,000.
- **Parts per quadrillion (ppq) or Picograms per liter (picograms/L)** - one part per quadrillion corresponds to one minute in 2,000,000,000 years or one penny in \$10,000,000,000,000.
- **Picocuries per liter (pCi/L)** - picocuries per liter is a measure of the radioactivity in water.
- **Action Level (AL)** - the concentration of a contaminant

which, if exceeded, triggers treatment or other requirements which a water system must follow.

- **Action Level Goal (ALG)** - The "Goal" is the level of a contaminant in drinking water below which there is no known or expected risk to health. The ALG allows for a margin of safety.
- **Maximum Contaminant Level Goal (MCLG)** - The "Goal" is the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
- **Maximum Contaminant Level (MCL)** - The "Maximum Allowed" is the highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
- **Maximum Residual Disinfectant Level Goal (MRDLG)**: The level of a drinking water disinfectant, below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
- **Maximum Residual Disinfectant Level (MRDL)**: The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
- **Running Annual Average (RAA)**: An average of monitoring results for the previous 12 calendar months.

Water Quality Data

We routinely monitor for contaminants in your drinking water according to Federal and State laws. The State of Arizona requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year, or the system is not considered vulnerable to this type of contamination. Some of our data, though representative, may be more than one year old.

These tables show the detected results of our monitoring for the period of January 1 to December 31, 2008 unless otherwise noted.

Microbiological Contaminants

Contaminant	MCL	MCLG	Unit	Result	Violation (Yes or No)	Sample Date	Likely Source of Contamination
Total Coliform Bacteria for Systems that collect <40 samples per month	No more than 1 positive monthly sample	0	Absent or Present	Present ¹	Yes	10/month	Naturally present in the environment
Fecal coliform and E. Coli	A routine sample & a repeat sample are total coliform positive, & one is also fecal coliform or <i>E. coli</i> positive	0	Absent or Present	Absent	No	10/month	Human and animal fecal waste

¹ Positive total coliform samples occurred in April and May 2008

Radionuclides

Contaminant	MCL	MCLG	Units	Level Detected & Range	Violation (Yes or No)	Sample Date	Likely Source of Contamination
Alpha emitters	15	0	pCi/l	1.9-5.3	No	13 Mar 08 27 Aug 08 10 Dec 08	Erosion of natural deposits
Gross Beta emitters	4	0	mrem	< 4	No	10 Dec 08	Decay of natural and man-made deposits
Combined radium	5	0	pCi/l	<0.3	No	20 Sep 07 18 Dec 07	Erosion of natural deposits
Uranium	30	0	ppb	1.2 – 2.8	No	10 Dec 08	Erosion of natural deposits

Lead and Copper

Contaminant	AL	ALG	Units	90 th Percentile	Number of Sites over AL	Violation (Yes or No)	Sample Date/Year	Likely Source of Contamination
Copper	1.3	1.3	ppm	0.24	0	No	1 Aug 07	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
Lead	15	0	ppb	6.3	0	No	1 Aug 07	Corrosion of household plumbing systems, erosion of natural deposits

Disinfectants

	MRDL	MRDLG	Units	Level Detected & Range	Violation (Yes or No)	Sample Date/Year	Source
Chlorine	4	4	ppm	0.37-1.1	No	RAA	Water additive used to control microbes

Disinfection Byproducts

Contaminant	MCL	MCLG	Units	Average	Range	Highest RAA	Violation (Yes or No)	Sample Date/Year	Likely Source of Contamination
Haloacetic Acids (HAA)	60	N/A	ppb	0.23	ND-1.4	N/A	No	11 Jun 08	By-product of drinking water disinfection
Total Trihalomethanes (TTHM)	80	N/A	ppb	2.3	0.56-8.0	N/A	No	11 Jun 08	By-product of drinking water disinfection

Inorganic Contaminants

Contaminant	MCL	MCLG	Units	Level Detected/ Range	Violation (Yes or No)	Sample Date	Likely Source of Contamination
Antimony	6	6	ppb	<3	No	29 Jan 07	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder
Arsenic	10	0	ppb	9.7-16	Yes	13 Mar 08 27 Aug 08 10 Dec 08	Erosion of natural deposits; runoff from orchards; runoff from glass and electronics production wastes
Asbestos	7	7	MFL	<0.2	No	20 Sep 07	Decay of asbestos cement water mains; erosion of natural deposits
Barium	2	2	ppm	0.037-0.15	No	29 Jan 07	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Beryllium	4	4	ppb	<1	No	29 Jan 07	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries
Cadmium	5	5	ppb	<1	No	29 Jan 07	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints
Chromium	100	100	ppb	6.3-21	No	29 Jan 07	Discharge from steel and pulp mills; erosion of natural deposits

Contaminant	MCL	MCLG	Units	Level Detected/ Range	Violation (Yes or No)	Sample Date	Likely Source of Contamination
Cyanide	200	200	ppb	< 8	No	29 Jan 07	Discharge from steel/metal factories; discharge from plastic and fertilizer factories
Fluoride	4	4	ppm	0.59 – 2.0	No	29 Jan 07	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
Mercury (inorganic)	2	2	ppb	<0.2	No	29 Jan 07	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills; runoff from cropland
Nitrate (as Nitrogen)	10	10	ppm	2.24-2.29	No	14 Nov 08	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Nitrite (as Nitrogen)	1	1	ppm	<0.2	No	14 Nov 08	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Selenium	50	50	ppb	<1	No	29 Jan 07	Discharge from petroleum and metal refineries; erosion of natural deposits; discharge from mines
Thallium	2	0.5	ppb	<1	No	29 Jan 07	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories

Synthetic Organic Contaminants, Including Pesticides and Herbicides

Contaminant	MCL	MCLG	Units	Level Detected/ Range	Violation (Yes or No)	Sample Date	Likely Source of Contamination
2,4-D	70	70	ppb	<0.1	No	20 Sep 07	Runoff from herbicide used on row crops
2,4,5-TP (Silvex)	50	50	ppb	<0.2	No	20 Sep 07	Residue of banned herbicide
Alachlor	2	0	ppb	<0.2	No	20 Sep 07	Runoff from herbicide used on row crops
Atrazine	3	3	ppb	<0.1	No	20 Sep 07	Runoff from herbicide used on row crops
Benzo (a) pyrene (PAH)	200	0	ppt	<20	No	20 Sep 07	Leaching from linings of water storage tanks and distribution lines
Carbofuran	40	40	ppb	<0.9	No	20 Sep 07	Leaching of soil fumigant used on rice and alfalfa
Chlordane	2	0	ppb	<0.2	No	20 Sep 07	Residue of banned termiticide
Dalapon	200	200	ppb	<1	No	20 Sep 07	Runoff from herbicide used on rights of way
Di (2-ethylhexyl) adipate	400	400	ppb	<0.6	No	20 Sep 07	Discharge from chemical factories
Di (2-ethylhexyl) phthalate	6	0	ppb	<0.6	No	20 Sep 07	Discharge from rubber and chemical factories
Dibromochloropropane	200	0	ppt	<20	No	20 Sep 07	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards
Dinoseb	7	7	ppb	<0.2	No	20 Sep 07	Runoff from herbicide used on soybeans and vegetables
Diquat	20	20	ppb	<0.4	No	20 Sep 07	Runoff from herbicide use
Dioxin [2,3,7,8-TCDD]	30	0	ppq	<5	No	20 Sep 07	Emissions from waste incineration and other combustion; discharge from chemical factories
Endothall	100	100	ppb	<9	No	20 Sep 07	Runoff from herbicide use
Endrin	2	2	ppb	<0.01	No	20 Sep 07	Residue of banned insecticide
Ethylene dibromide	50	0	ppt	<10	No	20 Sep 07	Discharge from petroleum refineries
Glyphosate	700	700	ppb	<6	No	20 Sep 07	Runoff from herbicide use
Heptachlor	400	0	ppt	<40	No	20 Sep 07	Residue of banned termiticide
Heptachlor epoxide	200	0	ppt	<20	No	20 Sep 07	Breakdown of heptachlor
Hexachlorobenzene	1	0	ppb	<0.1	No	20 Sep 07	Discharge from metal refineries and agricultural chemical factories
Hexachlorocyclo pentadiene	50	50	ppb	<0.1	No	20 Sep 07	Discharge from chemical factories
Lindane	200	200	ppt	<20	No	20 Sep 07	Runoff/leaching from insecticide used on cattle, lumber, gardens
Methoxychlor	40	40	ppb	<0.1	No	20 Sep 07	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock
Oxamyl [Vydate]	200	200	ppb	<2	No	20 Sep 07	Runoff/leaching from insecticide used on apples, potatoes and tomatoes
PCBs [Polychlorinated biphenyls]	500	0	ppt	All below screening levels	No	20 Sep 07	Runoff from landfills; discharge of waste chemicals
Pentachlorophenol	1	0	ppb	<0.04	No	20 Sep 07	Discharge from wood preserving factories
Picloram	500	500	ppb	<0.1	No	20 Sep 07	Herbicide runoff
Simazine	4	4	ppb	<0.07	No	20 Sep 07	Herbicide runoff
Toxaphene	3	0	ppb	<1	No	20 Sep 07	Runoff/leaching from insecticide used on cotton and cattle

Volatile Organic Contaminants

Contaminant	MCL	MCLG	Units	Level Detected/ Range	Violation (Yes or No)	Sample Date	Likely Source of Contamination
Benzene	5	0	ppb	< 0.5	No	20 Sep 07	Discharge from factories; leaching from gas storage tanks and landfills
Carbon tetrachloride	5	0	ppb	<0.5	No	20 Sep 07	Discharge from chemical plants and other industrial activities
Chlorobenzene	100	100	ppb	<0.5	No	20 Sep 07	Discharge from chemical and agricultural chemical factories
o-Dichlorobenzene	600	600	ppb	< 0.5	No	20 Sep 07	Discharge from industrial chemical factories
p-Dichlorobenzene	75	75	ppb	<0.5	No	20 Sep 07	Discharge from industrial chemical factories
1,2-Dichloroethane	5	0	ppb	<0.5	No	20 Sep 07	Discharge from industrial chemical factories
1,1-Dichloroethylene	7	7	ppb	< 0.5	No	20 Sep 07	Discharge from industrial chemical factories
cis-1,2-Dichloroethylene	70	70	ppb	<0.5	No	20 Sep 07	Discharge from industrial chemical factories
trans-1,2-Dichloroethylene	100	100	ppb	<0.5	No	20 Sep 07	Discharge from industrial chemical factories
Dichloromethane	5	0	ppb	< 0.5	No	20 Sep 07	Discharge from pharmaceutical and chemical factories
1,2-Dichloropropane	5	0	ppb	<0.5	No	20 Sep 07	Discharge from industrial chemical factories
Ethylbenzene	700	700	ppb	<0.5	No	20 Sep 07	Discharge from petroleum refineries
Styrene	100	100	ppb	< 0.5	No	20 Sep 07	Discharge from rubber and plastic factories; leaching from landfills
Tetrachloroethylene	5	0	ppb	<0.5	No	20 Sep 07	Discharge from factories and dry cleaners
1,2,4-Trichlorobenzene	70	70	ppb	<0.5	No	20 Sep 07	Discharge from textile-finishing factories
1,1,1-Trichloroethane	200	200	ppb	< 0.5	No	20 Sep 07	Discharge from metal degreasing sites and other factories
1,1,2-Trichloroethane	5	3	ppb	<0.5	No	20 Sep 07	Discharge from industrial chemical factories
Trichloroethylene	5	0	ppb	< 0.5	No	20 Sep 07	Discharge from metal degreasing sites and other factories
Toluene	1	1	ppm	<0.0005	No	20 Sep 07	Discharge from petroleum factories
Vinyl Chloride	2	0	ppb	<0.5	No	20 Sep 07	Leaching from PVC piping; discharge from chemical factories
Xylenes	10	10	ppm	< 0.0005	No	20 Sep 07	Discharge from petroleum factories; discharge from chemical factories

Violations

The following violations were received by our water system or were ongoing in the calendar year 2008

Type/Description	Compliance Period
Maximum Contaminant Level for Total Coliforms	May 2008
Maximum Contaminant Level for Arsenic	Full year 2008
Missed monitoring for Arsenic & Radionuclides	2nd Quarter

Luke AFB published Public Notices for the above listed violations in the base newspaper, the *Thunderbolt*. For additional information on the cause of these violations and their resolution, please contact Bioenvironmental Engineering at (623) 856 -7521. Other missed monitoring events occurred due to out-of-service wells at Luke AFB.

Health Effects Information About the Above Tables

Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant, and detected nitrate levels are above 5 ppm, you should ask advice from your health care provider. **Luke AFB drinking water nitrate levels are NOT above 5 ppm.**

Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems. Luke followed its re-sampling protocol in accordance with Arizona Department of Environmental Quality (ADEQ) requirements to determine the validity of the sample result. Re-sampling consisted of taking upstream and downstream samples within five service connections along with a re-sample at the original site where total coliform was detected. Additionally, utilities personnel immediately flushed the distribution lines where the positive samples occurred. All re-sampling in both instances was conducted within 24 hours of notification and results showed there were no coliform present.

Some people who drink water containing **arsenic** in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer. Arsenic in Luke's groundwater occurs naturally due to the salt deposits beneath the surface, and is frequently seen at similar levels across the desert southwest. Four of our five drinking water wells on the base slightly exceed the new EPA standard for arsenic. We've been planning and working for several years to meet this new standard, and we've nearly completed two projects that will reduce the arsenic in the finished drinking water supplied to you. A \$1.25 million arsenic treatment plant has begun operation in March 2009 and is producing water that meets EPA standards. A \$1.3 million blended water main that will blend water from two wells and with water from a third well that has no detectable arsenic is fully constructed. This project is being finalized in coordination with additional distribution system projects and we anticipate the completion of this work by the end of the summer in 2009.

People who drink water containing **radionuclides** in excess of the MCL over many years may have toxic effects to the kidneys as well as an increased risk of getting cancer. Uranium, radium, and radon are naturally occurring radionuclides found in the environment. Luke AFB has a history of being below the MCL for radionuclides, to include the most recent samples taken this year. Bioenvironmental Engineering was sampling to monitor more frequently to meet revisions to the radionuclides rule and initial monitoring requirements. Due to missed monitoring episodes in 2008, quarterly monitoring will be continued in 2009.

Infants and young children are typically more vulnerable to **lead** in drinking water than the general population. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested. Flush your tap for 30 seconds to 2 minutes before using tap water. Additional information is available from the EPA *Safe Drinking Water Hotline* at 1-800-426-4791.